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and the thoughtless should be warned. Then those residing in filthy dark, ill-ventilated abodes, should if possible be removed to higher and purer air, and afforded those comforts they stand in need of; such as firing, warm clothing, and nourishing food according to the season and climate.

The best preventatives, therefore, against an attack of cholera, during the prevalence of an epidemic are moderation in diet, avoiding raw vegetables, and whatever is found to disagree with the stomach, and fermented and spirituous liquors in excess, are peculiarly injurious. Flannel is to be worn next the skin, with a broad belt round the stomach, the feet should be kept dry and warm, and the bowels regular with a simple aperient pill if necessary. When much exposed to the weather a grain of quinine should be taken twice a day, on an empty stomach; exposure to cold damp weather, particularly the early morning and night air should be avoided, especially before eating; and the sleeping room should be elevated, warm, and well aired.

During epidemics the cholera sometimes appears in the cleanliest houses; attacking the strong and vigorous who are exposed to the predisposing and exciting causes; and by removing these, and by using proper precautionary means the fatality of cholera may be averted: the extent of its ravages being only formidable from neglect; and the fatal list is greatly diminished by proper sanitary arrangements. This is done by pointing out to the ignorant *the danger of* continuing their vicious habits, and among

the poor, the importance of diminishing the severity of the premonitory symptoms, and avoiding the predisposing, and the exciting causes which surround them.

It is possible cholera may be conveyed from one person to another by the breath, or dejections of the sick. Such cases I have never seen; and I am certain that among the class upon whom the duty of attending to the sick cholera patients must devolve, when the health is good, and the mind firm there is no danger from contagion. I have breathed the atmosphere of patients in the worst form of cholera in confined apartments for many hours, at all times, and seasons—yet the physician, the nurses, and attendants, escaped the disease.

The symptoms of cholera will thus vary in different seasons and epidemics; and from the rapidity of its course it is of great importance to judge of these varieties of symptoms; and how to act in the commencement of the disease, till the arrival of the physician.

The attack of cholera is sometimes sudden, when the person appears in good health; commencing with sickness, vomiting, and purging of a liquid, light coloured, turbid fluid, like whey or rice water. In other cases the attack is preceded with a looseness of the bowels; to the extent of three or four evacuations daily, with griping pains. These motions are at first thin but natural, like those of common diarrhœa; but as the disease advances they assume the characteristic appearance of the cholera evacuations—namely a pale watery matter, like thin gruel. In either case the individual feels sud-

denly weakened, the countenance contracted, anxious, and cadaverous, the eyes sunk, with a cold moist skin, and feeble pulse. Painful cramps of the extremities and abdomen follow; and the vomiting and purging become more violent, with a severe burning heat in the pit of the stomach, and urgent thirst. There is great coldness of the body, restlessness, and distress, while the mind remains unimpaired, with great languor, lassitude, and prostration of strength. The surface of the body is shrivelled, the sunken eyes have a livid circle round the eyelids, and a leaden or bluish appearance of the countenance, especially of the lips and nails; the pulse is very weak, and the voice is changed to a whisper. There is likewise a suppression of urine, saliva, and bile.

When the pulse increases in strength the skin becomes warmer, the vomiting, and purging, together with the cramps, and insatiable thirst have abated, the stage of reaction has commenced, and great caution is necessary for many days, that he fall not again back into a state of extreme danger. In fatal cases these symptoms are calmed on the approach of death, which follows from eight, or from twelve to thirty six hours of the attack.

No time should be lost in sending for medical aid, as no two cases are exactly the same, and each must be treated by the judicious practitioner according to the severity of the symptoms present; but, such is the sudden and dangerous form of the disease, it is most desirable not to lose the time that must pass before such assistance

can be procured, and the cholera patient must be treated according to the judgment and intelligence of the attendants.

The first object before the arrival of the physician is to employ domestic remedies to quiet the vomiting, and purging, to rally the animal powers, and to restore the bile, and other secretions. The patient is to be placed in bed between warm blankets, and surrounded with bottles, or bladders filled with hot water, and bags of hot sand or salt should be applied along the spine, and to the calves of the legs; and he should have immediately administered to him a dessert spoonful of mustard powder in a tumbler of warm water, with continued friction of different parts of the body with coarse hot cloths, and turpentine and oil. These means should be continued during the course of the treatment, diminishing or increasing them according to the state of the circulation and heat of the skin. The characteristic symptoms must be watched, and should a relapse take place the same means are to be repeated. Five grains of calomel, and a table spoonful of a mixture composed of a tea spoonful of laudanum, added to six tablespoonsful of brandy may be repeated every quarter, or half hour, in a wine glassful of hot water.

For drink a cold infusion of ginger, and culinary salt; and ice may be allowed to melt in the mouth. This should be followed by an assafœtida pill, broken down,* and given in sago, or brandy and water, and repeated

* See receipt, page 30.

every quarter, or half hour according to the urgency of the symptoms. An injection of three or four pints of warm water, or thin arrowroot will be useful, in which a teaspoonful of laudanum has been added. This may be repeated if the symptoms are severe. The animal powers are to be rallied, and the painful cramps removed by the application of a bandage to stop the blood proceeding to one or more extremities, by means of a garter, in which is inserted a pad of cotton of an oblong figure. This is placed over the bloodvessels to retard the blood in the humoral and femoral arteries, as they pass out of the trunk. Before this bandage is applied the limb is to be rubbed upwards to remove the blood, and the ligature is to be so tied as to stop the circulation in the arteries. I generally applied the pressure to the femoral and humoral vessels of the opposite sides. These bandages are kept on for an hour or two, or until the dangerous symptoms have disappeared, and reaction has taken place; when first one is to be slackened and slowly removed, followed by the other ligatures.*

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* See page 50, et sequ.

P. J. Crowe, Printer, 19, Cook Street, Cork.

Henry W Ackland Gothic

No 1.

With deepest respect of

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CHOLERA,

ITS SYMPTOMS, CAUSES,

AND

REMEDIES;

WITH

DIRECTIONS FOR TREATING THE DISEASE,

WHERE

MEDICAL AID CANNOT BE IMMEDIATELY PROCURED.

BY

THOMAS A. WISE, M.D., F.R.S.E.,

LATE INDIAN MEDICAL STAFF, &c.

Cork:

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PREFACE.

THE intention of the following treatise is to give a short account of Cholera in Asia, where the causes are better marked, and the treatment is different from that in Europe. This induced me to examine this important and fatal disease, when residing as Chief Medical Officer in the City of Dacca; in which neighbourhood the epidemic form of Cholera first broke out, in modern times, in its most malignant form, and still occurs annually in that city.

This treatise contains the result of that experience, and it is believed it will be of use in pointing out the advantage of sanitary arrangements in diminishing the violence, if not preventing the occurrences of these epidemic visitations; and as the disease often appears so unexpectedly, and runs its fatal course so rapidly, that the patient is often first seen by the Physician, when the disease has made such progress that the ordinary treatment is of no avail. Under these circumstances the new or hemostatic remedy will be found of great use. It consists in the partial obstruction of the blood in certain vessels, by which the circulation is contracted, the morbid

distribution of the blood is removed, and the strength of the patient is increased.

Dr. KELLIE of Leith, gave the result of his experience of this remedy in ague, as imparted to him by a Spanish pilot * ; and it was afterwards recommended by BAILLY in malignant intermittents. † Being unexpectedly placed in charge of a sickly Regiment in India, without the requisite supply of Quinine, I employed the tourniquets with very favourable results. This induced me to extend the use of this powerful remedy in Cholera, and other diseases, the result of which I published in M'CLELAND'S Calcutta Journal of Natural History‡. On returning to Europe, in order to test the efficacy of this novel remedy, I presented the result of my experience of the Hemostatic remedy, to the Imperial Academy of France ; but no report has yet been made by that learned Society. This delay induced me to give a short account of it in the *Dublin Quarterly Journal of Medical Science*, for August 1863.

The Cholera makes its occasional appearance in Europe, and it is perhaps never absent from India, where it is most fatal in its attacks. By the last Newspaper, dated Calcutta,

* In Duncan's Medical Commentaries for 1794 and 1797.

† Traité des fievres intermittèntes simples et pernicieuses.

‡ *No.* 28, for India, 1847, p. 477.

March 8th, it is stated " the weather is still cool, but Cholera has been making ravages amongst the Natives, and has also broken out amongst the European Shipping :" and by another account " Cholera has been for the last week raging among the shipping ; European Sailors are dying in larger numbers than we care to mention." Such statements are of constant occurrence, and are of great significance, as there is no doubt the disease still requires a careful examination, and a more successful treatment, as it annually destroys unknown thousands. This has induced me to print the following Treatise, in expectation that a short account of the Hemostatic remedy will be found useful, particularly in the collapsed stage of the disease in Asia; and as there are numerous cases in which a Physician is not within call, I have added a Chapter, or Appendix, for the use of the non-professional attendants. In this I have enumerated the usual course, and most characteristic symptoms of Cholera, with directions as to the plan to be followed, where Medical aid cannot be procured. It is expected that these directions will be found particularly useful in India, where so many valuable lives are lost from not following a proper method of treatment, in an early period of the disease.

TABLE OF CONTENTS.

PREFACE.

CHAPTER I.

DESCRIPTION OF THE DISEASE.

Page.

SECTION 1.—Premonitory Symptoms. 1

— 2.—Symptoms and varieties, ... 4

CHAPTER II.

CAUSES OF CHOLERA.

Predisposing and exciting,... 11

CHAPTER III.

Prophylactics of Cholera, ... 22

Section 1.—Personal, ... "

— 2.—Public, ... 25

CHAPTER IV.

Nature of Cholera, ... "

CHAPTER V.

Treatment of Cholera, ... 29

General treatment: Hemostatic means: Cases .. "

CHAPTER VI.

APPENDIX.

Characteristic symptoms of Cholera, which may be recognised by a non-professional attendant, with general directions for the treatment of Cholera, previous to the arrival of the Physician, .. 55

CHOLERA,

ITS SYMPTOMS, CAUSES, AND TREATMENT.

The names of cholera, spasmodic cholera, blue cholera, cholera asphyxia, epidemic cholera, are given to this mysterious disease; many circumstances regarding which still require investigation: among these I propose to consider, in the following treatise, its peculiarities, causes, and remedial measures.

CHAPTER I.

DESCRIPTION OF CHOLERA.

The description of this disease may be considered under the heads of premonitory causes, and peculiar and varied symptoms.

SECTION 1.—PREMONITORY SYMPTOMS.

Some visitations of Cholera are ushered in by diarrhœa, which often comes on suddenly, sometimes with a copious evacuation of a pale acrid fluid, which is expelled

with force from the mouth and anus. The patient complains of a burning pain in the epigastrium, spasms of the lower extremities and muscles of the abdomen, without coldness of the extremities, or weakness of the pulse. When these symptoms have continued for some time, they are succeeded by faintness and exhaustion, which, if not checked, may be followed by collapse. This disease has been named diarrhœa cholerine. The violence and duration of these premonitory symptoms vary in different individuals and epidemics, and may be considered, as a distinct disease; and being under the influence of medicine, should be watched with care, and means employed to arrest it. This is of great importance, as it is sometimes the precursor of cholera. Such a fact proves the importance of house to house visitations during the course of an epidemic, as the diarrhœa is not considered of importance by the patient, and no assistance asked until the more fatal symptoms of cholera have developed themselves. The treatment in these cases consists in keeping the body warm, with frictions to the feet, back, and abdomen, followed by turpentine fomentations, with heated bran, or salt, and mustard poultices, when the pain is severe. Calomel and quinine, calomel and opium, or lead and opium may be administered internally with astringents, such as prepared chalk, kino, catechu and opium, in small and repeated doses. A bolus of three grains of ipecacuanha powder, and one of opium, will be of use in arresting the acute pain in the abdomen. When weak, diffusible stimulants such as the carbonate

of ammonia, and brandy with arrow root are necessary. Pure water, soda water, or barley water may be exhibited as drink.

Cholerine appears sometimes to be produced by indigestible food, residing in an unhealthy locality, or from some unknown individual peculiarity or condition. When several are exposed to the exciting causes, one person is affected with cholerine, another with cholera, while a large exposed class escape altogether. In a school house, situated near an unhealthy marsh, one of the residents was attacked with the blue, or most virulent form of cholera; a second patient had cholerine; a third bilious diarrhœa, while the other children, exposed to the same cause, escaped.

In June, 1847, several persons suddenly complained of cholerine. Three were elderly, and the disease appeared to be produced by eating indigestible food; the fourth was a young man, after eating potted beef; and a fifth, a young man, apparently from exposure to cold and damp. In these cases there were frequent and copious whitish liquid motions, with vomiting; and in the last mentioned case, accompanied with considerable spasmodic pain in the abdomen. The irritating cause may have produced the discharge, while the biliferous ducts contracted spasmodically, so as to close the passage of the bile to the intestines. The usual remedies were early employed, and the patients were soon convalescent. When remedies are not exhibited, and proper attention to diet and regimen observed, the cholerine may pass into an attack of dangerous cholera.

SECTION 2.—SYMPTOMS AND VARIETIES OF CHOLERA.

The invasion of cholera is generally unexpected and sudden, and the precursory symptoms are more distinct in Europe than in Hindostan, where they do not always occur. The attack usually commences with vomiting and the discharge from the intestines, first of their contents, and then of a copious watery fluid of a whitish colour. In other cases the disease commences with a feeling of faintness, trembling and giddiness, with nausea and occasional vomiting, while other patients feel an uneasy burning sensation of pain and oppression about the precordia, followed by copious purging of a pale fluid like rice water, having a faint peculiar smell. Such evacuations empty the intestines, and produce a feeling of exhaustion and prostration of strength, indicated by the pale shrunken countenance, and weak and irregular pulse. These symptoms may last several days, and in other epidemics they are absent.

The differences in the symptoms and degree of fatality in different individuals and epidemics are the tonic form of cholera, which occurs in the strong and healthy, and the atonic, which is more frequently seen in children and weak individuals, in certain epidemics, and towards the last stage of dangerous attacks.

The *Tonic Cholera* often sets in suddenly by the occurrence of liquid stools, followed by vomiting, prostration of strength, cold clammy sweat, and a quick, irregular, and *feeble pulse*. The patient becomes exhausted, and indiffe-

rent to the result; the face becomes pale, pinched and anxious; the eyeballs sink, the lids become dark, and livid, the cornea of the eye dull and suffused: the surface of the body is cold, sodden, shrivelled, and covered with cold perspiration, and every hair seems to have its drop of clear, cold moisture hanging upon its extremity, while the patient complains of oppressive internal heat, particularly at the pit of the stomach. The breathing is slow and laborious, and the expired air is cold; the fingers and toes are shrivelled and blueish; the skin loses its sensibility, and the body its power of motion: the tongue is pale, flabby, and cold, and the mouth parched, with constant calls for cold water, which is immediately rejected from the stomach. There is a profuse gush of whitish-coloured liquid, containing small flocculi, from the intestines at intervals, first of two hours, then of one, afterwards more frequent and scanty, and at last involuntary.

In some cases indescribable anguish, restlessness, and uneasiness exists, with colicky pains in the abdomen; and most distressing cramps occur in paroxysms, at first in the lower, and then in the upper extremities, which sometimes extend to the stomach, chest, and throat. These are often so severe as to make the patient cry aloud! And his voice is feeble and hollow, so as to be scarcely audible. In this state of weakness his intellect, when roused, remains calm and clear to the last. In severe cases, a few hours after the invasion, the stage of collapse commences, when the patient becomes more tranquil, dozes, and this passes to a deadly stupor. The peculiar and dangerous symptoms of

cholera are aggravated by the great loss of serum of the blood, and the languid circulation and congestion of blood in the heart and lungs. This produces the weakness of the heart's action, and the great cold of the surface of the body, especially in the extremities, with the oppression, restlessness and difficulty in breathing. The debility and spasm of the uriniferous and biliferous tubes explains the cessation of the secretion of urine and bile; and from the spasms of these ducts none is discharged into the intestines, so that after death the gall-bladder is found full of black bile. As the disease advances the distressing spasm extends to the abdomen, especially between the scrobiculus cordis and umbilicus, and passes to the extremities.

In some cases of cholera there is neither purging nor vomiting; and the former symptoms usually precede the latter. The pulse is regular, full and oppressed at the commencement of the attack, and varies according to the strength of the person; but as the disease advances, it becomes low, weak, fluttering and imperceptible. When the blood is examined it is found dark coloured and thick.

These symptoms are sometimes succeeded by a stage of febrile re-action, when the body is hot, while the extremities remain cold, from the state of congestion of the head, chest, and abdomen, and may be expected when the symptoms of cholera begin to yield; when the evacuations become less frequent, the cramps less severe, and occur after a longer interval, with hiccough. The body then feels warmer the expression of face is less anxious, the respiration more

easy, and the pulse, though frequent, is more distinct, and the patient falls into a natural sleep. These symptoms are succeeded by the re-appearance of fœcal matter in the stools, and by the restoration of the salivary, bilious, and urinary secretions.

In the *atonic* form of cholera, the pain and spasm are less in degree, or are not observed. The patient has less vomiting, he becomes restless, with great inquietude, which slowly diminishes as the cold and collapse increases; the perspiration becomes more copious and cold, his extremities powerless, and he is displeased when disturbed. The features become quickly sharp, and shrunk, the eyes suffused and glassy, with a dark areola round them. The pulse at first small, weak, fluttering, and almost imperceptible, and ceases in the extremities, with the skin cold and covered with perspiration, followed by a blueness of the extremities and nails, and great coldness of the body. This is produced by the diminution of the nervous energy, which, acting upon a weak state of the heart, causes it to contract with rapidity, and irregularity. This state of prostration is accompanied with great anxiety, restlessness, and distress, and passes to a state of drowsiness, which ends in torpor, apparently from the weakness, followed by the fatal stupor. It is, therefore, of importance, in such cases, to avoid indulging in sleep until the strength is somewhat restored. The vomiting and purging are sometimes preceded by spasm, when the patient suddenly, and often unexpectedly, sinks, after passing a large quantity of colourless fluid by the mouth and anus. The heat of the hands diminishes more rapidly than of the

feet, while the head and trunk remain warm. In some cases a feverish re-action takes place; and what is taken by the mouth, or is inserted by the anus is retained, but remains unchanged from the palsied state of the stomach and intestines. The respiration is hurried and oppressed, with long and frequent inspirations, and the expired air feels quite cold. The extremities become shrivelled, with a whispering, low, and sepulchral tone of voice, followed by indistinctness of utterance, restlessness, and anguish, with a dislike to answer questions. The patient becomes rapidly weaker, and the perspiration more copious and cold, till he dies.

There are peculiarities in different epidemics: in one the spasmodic symptoms are severe; in another the strength is prostrated with cold extremities and great thirst and restlessness. In an epidemic in Dacca, the cholera patients had a good appetite a short time before death, and in another the disease was ushered in with one or two evacuations of a thin pale colour, with indescribable anxiety, restlessness, and exhaustion, and death followed a few hours after the invasion. In the epidemic cholera of 1847, the characteristic symptoms were coldness of the extremities, great and indescribable anxiety and restlessness, unquenchable thirst, and extreme weakness and death. In these cases, the vomiting and purging were soon stopped, without the occurrence of spasms or suppression of urine. The cholera of 1849 produced a blue colour of the extremities without spasm. The attack was *sudden, followed in a* large proportion of cases with fatal

results. In other of these epidemics the disease was characterised by great and early depression of strength, and was treated with advantage with remedies which were not so successful at other times. (a) In considering these varieties the only pathognomonic symptoms of cholera was the collapse.

In general the symptoms of cholera were much the same in the European and Asiatic, in England and in India, excepting that in the latter country the disease runs a quicker course, while from the stronger vital powers of the former, reaction more frequently occurred, and the restoration of the capillary action was more apparent than among the Asiatic tribes. In some of these cases, the disease runs its fatal course in ten or twelve hours, other patients rally for a time, and again fall back, and die. These fatal changes are often sudden and unexpected, particularly on taking more exercise than the weak state of the body admits.

A peculiar feature in the much dreaded cholera is, that the fear of it vanishes as soon as the patient is attacked. The mind remains unclouded; and, during the course of the disease the patient may be conscious of his danger is resigned, and often will not allow that he is labouring under cholera. The brain appears to be one of the last organs which becomes blunted.

The favourable indications are when the symptoms have not been severe; when the cramps and vomiting cease;

(a) Martin's Topography of Calcutta, p. 189

the stools come more consistent and less frequent; when the pulse becomes slower and fuller, and the respiration more easy, with an increase of heat on the surface of the body; a less anxious expression of face, and a return of natural sleep. These favourable indications are rendered more marked by a restoration of the hepatic and renal secretions.

The judicious exhibition of medicine from an early period of the attack, and during its progress is always favourable to the patient's ultimate recovery. The prognosis is rendered less favourable when the patient is very young or old. The former in some cases throw up his sour and indigested food, and becomes restless, anxious, and thirsty, the temperature of the body diminishes, and he sinks after one or two white liquid stools. Sometimes the little patient lives for days, during which he has one or two watery stools, which may be checked by strong counter irritants. Sometimes convulsions occur, which require the use of the hot bath, sinapisms, and friction of the extremities, with cold to the head. Much care and attention are required to detect these cases of cholera in children at an early stage, so as to be able to administer the necessary remedies. In general the violence of the symptoms of cholera, particularly the coldness of the extremities, the prostration of strength, and even the discharge of worms from the intestines, are indications of danger. When the respiration becomes slow, laborious and stertorous in the course of cholera, from the congestion of the great vessels about the heart it

leads to infiltration of the lungs, if not prevented by timely and appropriate remedies, may prove fatal, even after reaction has been established. In such cases the patient may recover from the immediate attack, but as reaction takes place they become comatose and apoplectic. Other patients die exhausted several days after the symptoms of cholera had disappeared. In the most favourable cases, an indiscretion in exposure, or in diet and regimen, may produce a relapse of the disease, which is always most dangerous.

CHAPTER II.

CAUSES OF CHOLERA.

Cholera may occur at any season of the year; but in Bengal, it most frequently appears in its epidemic form when noxious terrestrial emanations prevail, at the end of the rains, and at the commencement of the hot season, particularly after a long period of dry weather. These periods of the year are usually unhealthy, when the variations of temperature between day and night are most marked.

The predisposing cases of cholera are observed to be long fasting, great fatigue, intemperance in eating and drinking, exposure to cold and damp, particularly during the night. In other patients mental depression, fear, and looseness of the bowels, act in this way; or the injudicious use of purgative medicines, the saline class in particular, which, acting strongly on the mucous membrane, and less on the liver, produce a watery discharge from the bowels.

The removal of regiments in India, to distant stations, at unhealthy seasons, renders them subject to cholera, from the fatigue and exposure of the troops to the constantly changing atmospheric conditions, and tomalaria, with the use of bad water and indigestible food. This explains how cholera makes its appearance on the banks of rivers, attacking the poor and intemperate, especially those who are worn out and depressed by toil, make use of innutritious food, reside in low, damp, filthy huts, and are exposed to the inclemency of the weather. Hence the frequency with which the lower class of the native population are affected during epidemic visitations in India, compared to the middle and higher classes, who are well housed, well fed, and well clothed. This difference is particularly evident in Bengal, where the distinction of rank is marked, and the influence of malaria is most powerful.

In the large Mahommedan city of Dacca, where ventilation and cleanliness are much neglected, the poverty of many of the people is so great, that they often eat in the morning the cold and fermented rice which had been prepared the day before. The hilsa fish, or salmon of India, is very unwholesome; and at one season of the year is consumed in large quantities, and seems to be a very common cause of cholera, particularly when eaten in a putrid state, which they think enhances its flavour. During the year 1847, there were very few cases of cholera in Dacca, and they assumed a very mild form, which seemed to be owing to heavy rains in the cold month of October, when there was little evapora-

tion from the saturated soil, and slight malarious emanations; and from some unknown cause the supply of hilsa and other unwholesome fish was small, which prevented the natives indulging their appetites to their usual excess.

Another cause of predisposition to cholera occurred in the up-country Sepoys, and those who use unleavened bread (chapatees) in Bengal; from being composed of flour of rice, and flour of wheat: as the former required more firing than the latter, the bread was often insufficiently baked, and most indigestible.

Such is the indolence and improvident habits of the natives of India, and their belief in fatalism, that with a genial climate, and fruitful soil, they rarely lay in a stock of food, or save money for procuring the necessaries of life, should bad crops occur. The consequence is, that when any irregularity of the seasons happen affecting their food, it becomes dear; and should a succession of such seasons occur, famine is the consequence; as in 1770 in Bengal, when the third rice crop was burnt up, and this staple article of food rose in price to four, and at last to ten times its price. On another occasion, when residing at Hooghly, during a high tide, a violent storm arose, which produced a wide spread eruption of sea water. This covered the rice grounds, and filling the tanks and marshes of a large part of the district. The water became tainted, which destroyed the fish, and was followed by a deadly murrain, when multitudes of cattle died, followed by a fearful epidemic fever, cholera, and dysentery; from

so many people living in the same exposed condition. The mortality first fell on the cattle, then on the old and young, and lastly on the strong adult. Few of the children escaped. The parents in these days of woe showed the most callous indifference about their children, and often sold them for a rupee each. Their mental as well as their corporeal powers were much weakened, and a strong man was never seen. During the epidemic, vast numbers of the people were exposed to the same causes, had the same scanty unwholesome food and drink, and were affected by the terrible visitation: they were emaciated in figure, had a shrivelled and yellowish discoloured appearance, with their extremeties swollen, by dropsy. When spoken to, they stood aghast in stupid amazement, and rather rebuked the injustice of God, as they called it, than implored his mercy and forgiveness. In this condition of desolation, when they had the power; they fled to places that were less under the scurge, leaving all they held most dear behind them.

In independent states the ignorant and suffering people sometimes become seditious, complained that their chief was unlucky, and that the calamity was the mark of the displeasure of God. They even proceeded, in some cases, to depose, or to sacrifice him to their fury. On such occasions the chief, to avoid this, enlisted the services of the most celebrated Brahmin, who often used cunning and artifice to accomplish their end. Religious ceremonies were performed, prayers offered up, and promises made, to afford time

for the decline of the epidemic; and when it ceased their prayers were declared to have been heard, and the chief was considered the friend of God, and the safeguard of the people. They were loud in his praise, called him the *wulleh*, or friend of God, and the worker of miracles.

This enthusiasm is explained by the state of destitution and despair in which the people were in. Many of them had died of starvation, lingering multitudes sought subsistance from leaves, and the bark of trees. The highways and fields were choaked with the dying and the dead; in some villages the sick, were huddled together; and the dog, the jackal, and the vulture, were the only scavengers, and sometimes devoured the bodies of those in whom life was not extinct. A dead like silence succeeded the continual wailings of the sufferers, and in their distress mothers have been known to devour their children, or to end their sufferings by throwing their offspring into the sacred Ganges, rather than see them pine and die. Multitudes flocked to the towns, where charitable relief was hardly discernable among such multitudes.

In the plains of Hindostan famines are now seldom seen from the extent of cultivation, and from the greater variety of crops than formerly; so that instead of being septenial they rarely occur, and are more limited in their range. During my residence in India, several fearful famines occurred, and swept away their millions. In 1833, fifty thousand persons perished of famine in the

north of Septr: in Lucknow; 50,000 perished in the district of Moultan, and 1,200 died of want in Cawnpore. During these fearful visitations, half-a-million sterling was subscribed by the charitable to relieve the distressed. In Guntow, 250,000 human beings, 7,400 bullocks, 159,000 milch cattle, and 300,000 sheep and goats, died of starvation, and it was supposed that no less than half-a-million of human beings perished. (a)

In twenty months a million and a half of people are computed to have died of hunger and its immediate consequences in one visitation; and the direct pecuniary loss occasioned to the government by this single visitation, exceeded four millions sterling. A sum that would have gone far to avert the calamity from which it arose; had it been expended in constructing canals to irrigate fields, or as thoroughfares to connect the interior with the sea, or districts where scarcity prevailed, with those where human food was to be had in abundance.* It must be acknowledged that the sums expended on railroads and canals are rapidly preventing such fearful visitations, and the government appear fully alive to their benefits.

Such weakness rendered the people very susceptible of the malarious influence, producing malignant fever, dysentery, and cholera, which appear at different times and

(a) Notes on India, by Dr. Buist.

* Ibid: Even in 1861, when such a famine existed in India, andfood was not to be had; at a couple of hundred miles, was in abundance, and at the ordinary prices.

places. On the Magna river, when the two former diseases were very common and fatal in the jungle, cholera was committing great ravages on the exposed banks of the retiring river.

The *exciting causes* of cholera are always obscure, and are best observed in the low, damp, alluvial country, where the inhabitants live in a primitive manner, and are but imperfectly defended from the surrounding morbific agents. In more civilised countries, and in cities, these causes are modified and increased in number, which renders them more obscure.

The neighbourhood of the city of Dacca, and lower Bengal in general, is so little raised above the level of the sea that the country is for a time in a state of almost complete submersion from the periodical rains, and from the great volume of water which comes down from the immense range of mountains that bound Hindostan, on the north. From these sources the rivers sometimes rise twenty feet in one day; and as the torrents meet with numerous sluggish canals (nullahs) which intersect the country, and are not in the direct course of the rivers, they raise or heap up the water in them, and in the lakes from which they proceed. I have often seen the clear dark green water, loaded with vegetable matter, filling such nullahs for miles, until they joined the direct course of the rivers, which contained the light brownish muddy water of the main stream. The green-coloured waters of the marshes (jeeals) and creeks increase in height, overflow their banks, and vegetable

matter soon covers the water. So luxuriant is this, that it has often the appearance of a green field, and has been known to have been mistaken for such, and endangered the life of the stranger. As the rivers are emptied the vegetable matter quickly decays and renders the water so impure and unwholesome that fish leave it. Still the lazy inhabitants of Bengal use this unwholesome drink, rather than be at the trouble of going to some distance for pure water.

In lower Bengal, the months of September, October, and November, are particularly unhealthy, from the drying up of the inundation, and the generation of malaria being fostered by different causes; and on the river retiring produce the epidemics which annually attack large numbers of the inhabitants of Bengal, who reside, at this season, near their banks. The atmosphere is then calm and still; the days are hot; and the nights cold and damp, from the powerful radiation of heat, and the condensation of moisture on the cold carpet of the earth. This damp and chilly period, is the time when malaria acts with the greatests power; and epidemic diseases are most common and dangerous. These diseases appear every year along the margin of marshes, and the course of large rivers, when their channells are covered with a thick deposit of silt. As the rivers subside, their banks dry up, and as this process advances to a certain point, malaria is generated, which renders those exposed to its influence particularly liable to fever, dysentery, and cholera. The last disease appears every year at Dacca, at the beginning of the cold

season: the first cases usually occurring among those who reside in the neighbourhood of the broad slimy banks of the canal, which passes through the city. In the epidemic of 1848, I could distinctly trace cholera originating in this locality. In July after exposure to a cold easterly wind blowing from a marsh, a gentleman had a severe attack of cholera. Three other persons exposed to a like cause, were effected, one with diarrhœa, another with cholerine, and a third with blue cholera. A gentleman in an adjoining house soon after died of blue cholera from a like exposure. A gang of prisoners, employed in making a road along the bank of the river, that had been covered with water, were attacked, with cholera; a second, and a third set were thus attacked, when the prisoners in the jail were free from it. A young lady walked in the cool of the evening along the bank of the river, and did not change her damp shoes; she was attacked on the following morning with blue cholera, and died 13 hours after.

From the position of friends along the course of the Magna River in 1846, I was able to trace the course of the epidemic, when the inundations which had been unusually extensive, had declined. In many places whole villages were deserted, the inhabitants having died of the epidemic cholera, or from fear, had fled from their homes. The visitation of the disease continued from five to seven days in one village, and then passed to another, which was explained by its occurring at a particular stage of evaporation. In the year 1849 the rivers remained very high to

an unusual date, so as to prevent the sowing of indigo till the 22nd October, when my reporter states—"The people here are unusually healthy. Last year when the inundations had subsided at this time, cholera was raging in the neighbourhood; this year I have not heard of a single case. It became common and fatal in November, when the rivers had subsided, and the banks had been sufficiently dried for the production of malaria." Another accurate observer writes in the beginning of 1850, from the neighbourhood of Mymensing:—"I have but little information to give you on the subject of cholera. Last year it was particularly mild, and scarcely made its appearance before the early part of December. This was owing to the rivers commencing to diminish then. The previous year a considerable fall in the river took place in September, and cholera broke out immediately, and was very destructive during October and November."

While cholera was of such frequent occurrence on the banks of rivers, the inhabitants of high and dry situations were but rarely affected; and when attacked, the disease appeared with less intensity. Malignant fevers were more common inland where there was much junge, and to which place the inundation had not extended.

The progress of the epidemic was generally with the stream and against the prevailing wind. Having attacked a particular village in which it was very fatal, it sometimes suddenly left it: passed over the next village, and after attacking another, returned to the village that had escaped, *and did not again* appear in the one that had suffered

during the first visitation. This peculiarity has been noticed by other observers. The disease, says Dr. Jameson, "would sometimes take a complete circuit round a village, and leaving it untouched; pass on as if it were wholly to depart from the district. Then after a lapse of weeks, or even months, it would suddenly return, and scarcely re-appearing in the part which had already undergone its ravages, would nearly depopulate the spot that had so lately congratulated itself on its escape. Sometimes after running a long course on one side of the Ganges, though with intercourse between its banks, it would, as if actuated by some unknown agent, stop at once, and taking a rapid sweep across the river, lay all waste on the opposite bank." In all such cases I found that the most disagreeable smell was by no means the most dangerous. This rather depended on the state of evaporation from the banks of the river, which required to reach a certain degree of dryness to render it dangerous. When the banks were covered with water, and even when kept moist, the neighbourhood remained healthy; but when nearly dried up, those inhabiting the low mud huts were chiefly attacked.

We thus explain the progress of cholera, by the laws which govern epidemic visitations: being more violent, rapid, and fatal in its first appearance, even under the best treatment. It attacks more frequently persons between the age of twenty and forty; particularly the weak and dissipated, and the males exceed the females. Cholera is also more fatal in the old and weak; and among insane patients the disease is generally fatal.

CHAPTER III.

PROPHYLACTICS OF CHOLERA.

An attack of Cholera being always accompanied with danger, the first object of the Physician is to prevent its occurrence. These measures may be arranged according as they are personal or public. To the former is to be referred the individual changing the locality to a higher and dryer situation, when the disease appears epidemically. In the upper provinces of India, on such an occurrence taking place, the inhabitants of the plains leave their villages for a more healthy situation, and those of valleys fly to the top of the neighbouring mountains, where they are aware they are safe. When cholera attacks regiments, the camp should be removed to a convenient distance; and a dryer and more elevated situation is found by experience to be the most effectual means of getting rid of this disease.

The principal prophylactics are residing in a high, dry, and healthy situation in the country; taking sufficient sleep, and regular exercise in the pure air, while avoiding fatigue, exposure to the hot sun, and night air, particularly if cold and damp. The individual should abstain from severe mental exercise, fear, anxiety, grief, and such like depressing passions, and the influence of sudden changes of temperature, by adequate warm clothing, and personal cleanliness. Wet clothes should be changed, and all chills avoided; by wearing warm clothing, and particularly a flannel belt round the abdomen. The food should be

wholesome and solid, with good potatoes and salt, biscuit, rice, and oatmeal; while tainted indigestable meat, damaged vegetables, and impure water with excesses of all kinds avoided.

During such epidemic visitations, it is of importance to sleep in a large elevated room, with the windows closed in the direction of unhealthy quarters, particularly when the wind blows from that direction. When this cannot be done, a window curtain, a bed or musquito curtain, or even a piece of gauze covering the face, will prevent the bad effects of unwholesome malarious effluvia. When obliged to go out early in the morning, he should take a cup of coffee, or chocalate. He should live temperately on plain nutritious invigorating and moderately stimulating food, while high-seasoned soups and sauces, made dishes and pastry, all indigestible, vegetables, and stimulating drinks, which derange digestion, are carefully avoided. This is more necessary as their is always a tendancy to indigestion and diarrhœa during such visitations. For this reason a few grains of quinine is of much use, or a few drops of diluted sulphuric acid has been strongly recommended by that able philanthropist and physician Dr. M'Cormack, of Belfast. In like manner an occasional alœtic and colocynth pill, with a small proportion of calomel, to promote the secretion of bile, will be found an excellent preventative against cholera.

For a like reason, purgatives, particularly of the saline kind, intemperance, or that which produces weakness, are liable to bring on cholera. Hence it is that persons

with broken down constitutions, the dissolute and abject poor, who are in want of bodily comforts, whether in lodging, clothing, or diet, are most subject to the attack of epidemic cholera.

The great public measures to prevent cholera are, by the removal of all decomposing filth, and putresant matter about the dwelling houses; by opening out streets and roads to allow free ventilation; by effective drainage, removing slaughter houses, preventing the leakage of gas into the sub-soil, and intermural sepulchres, the pollution of rivers near towns, and providing a competent supply of pure water. But even the introduction of this into a town may increase the mortality, if means are not prepared for carrying away what is not required, and not allowing it to soak through masses of impurity, that may have collected in the place for ages, which foments, and produces typhus fevers, dysentry, and cholera. These causes of cholera become more powerful when the temperature rises during mild, muggy weather, without rain or lightning.

This explains the appearance of cholera in cold, low, damp, and dirty localities, and its passing over burning deserts, crossing different climates, both by sea and land: one day apparently borne on the wings of a favouring wind, and at another time against the monsoon itself.

Cholera sometimes occurs on board of ships, by the same, or similar causes as on land; and is to be prevented by avoiding overcrowding the decks, and recollecting that more than the usual quantity of fresh air is required

during the prevalence of such an epidemic. The sleeping berths should be kept perfectly clean, and well ventilated, and the space of nine square feet should be allowed for each individual. At the same time, all bilge-water should be carefully removed, and dampness avoided by using dry scrubbing.

CHAPTER IV.

NATURE OF CHOLERA.

When a person has been attacked with cholera, the physician should endeavour to lessen the supposed causes, which may be in such a concentrated state that the disease may assume a contagious form. It consequently becomes of importance to prevent others from being attacked, by correcting badly constructed houses, so as to have good drains, proper ventilation, and white washing; and to diminish the virulence of these causes by cleanliness, by the use of lime water, and a solution of the chloride of lime to the infected dwelling, street, or court. The houses should then be fumigated, and the body, and bed clothes purified.

The progress of cholera in Europe resembles other such epidemic visitations; being generally preceded by unusual meteorological and physical phenomena, such as floods, storms, excessive hot and close weather, with earthquakes, blights, and murrains. Its progress towards England was irregular, lingering for a considerable time on the shores of the Baltic and Mediterranean seas; avoiding dry, cool, and

elevated spots, in its first progress towards Europe; and affecting severely Poland, and Western Prussia, the inhabitants of which are dirty in their habits. It first appeared in the low, foul, badly ventilated streets, courts, and lanes, where the houses are huddled together, and the quality and supply of water defective. In such localities the cases of cholera were most numerous and fatal, particularly where putrifying animal and vegetable matter abounded, and the land had reached a certain stage of dryness; while high and dry situations, where the air and water were pure, escaped the disease.

The same cause produces cholera, in those who live on the banks of the great rivers in India; when the waters subside after the rains. There dangerous remittent fevers appear in the wooded parts, where there are much vegetable deposits. Other diseases such as typhoid and typhus fevers, sore throat, aphthœ and diarrhœa occur in summer; and fatal bronchitis in winter, in low damp and crowded places, where filth abounds, and where foul cess-pools, choaked sewers, and neglected sinks are in the neighbourhood.

The following deductions may be drawn from the above facts:—

1.—The inhabitants of Bengal living chiefly on rice, and indigestible vegetable food, with unwholesome fish, and little clarified butter, were weak and predisposed to be affected by the influence of noxious emanations.

2.—The retiring of the waters of the great rivers in *India* leave large spaces covered with silt, which appeared

to be only dangerous where it was nearly dry. To this cause was added the low damp mud hut, the impurity of the water, and the infiltration from cess-pools into the wells in towns, or the evacuation of the pent-up marshes, filled with animal matter, into canals, from which the drinking water was obtained.

3.—During the prevailing cholera epidemic in Bengal, the air was very sultry during the day, and cold at night, from the powerful radiation of caloric. There was no wind, and little electricity, so that the air, especially in low situations, gravitated like marsh-poison, being loaded with stagnant impurities from the river, the morass, or the jungle. Under these circumstances, the oxidizing principle of ozone, mixed with decomposed organic matter, may produce the poisonous miasms. The great advantage of living on an elevation is well known in India, and Dr. Farr discovered the law of mortality to be inversally as the altitude. (i) The Europeans in Bengal, residing in better houses, and in more elevated situations, and being better clothed and fed, generally escaped such epidemic visitations.

4.—These causes, with a certain temperature, produce the disease, which followed a mysterious course from east to west. The poison is wafted from one situation and country to another, according to a moving epidemic virus, resembling malaria, which requires a state of the atmosphere and locality, favourable to its developement, and a

(i) Letters on the Report of the Registeral Gazette.

peculiar condition of the animal economy. In the dirty ill-ventilated sea-port towns, enveloped in malarious emanations, and inhabited by people predisposed to the disease, in one person is produced diarrhœa, or cholerine, and in another the deadly form of cholera. As we found it passing over villages on the banks of the Indian rivers; in Europe it passed over towns, streets, and villages; where the sewerage and ventilation had been attended to, and the inhabitants lived on better food; to appear in other places under less favourable circumstances.

Cholera does not, consequently, multiply itself in the human body, as scarlatina, small pox, and other contagious diseases do; but by an epidemic influence, affecting cities or even countries. Does it propagate itself by contagion under any circumstances? In Bengal where cholera first appeared in its fatal epidemic form, and where it is annually seen, as the result of an extensive practice, and with my attention directed to this important subject, I never observed such a case even among the insane in India, who are peculiarly susceptible of the disease. On these occasions one was attacked in one ward, and another in a ward near, and a third in a distant ward; but I never found that cholera passed from one patient to another; nor saw nurses, attendants or patients in the same ward, catching the disease. Still it may become contagious under particular circumstances; such as crowding in confined unhealthy houses, exposure to the breath of the sick person, and the secretions from the gastro-intestinal membrane, the chief seat of the disease. Such should be

avoided; and from the danger of malarious influence, the patient should be removed from a low damp situation to a dry and elevated well-aired dwelling.

CHAPTER VI.

TREATMENT OF CHOLERA.

The treatment of this disease must be varied with the peculiarities of the epidemic, by the age and strength of the patient, by the severity of the symptoms, and the stage of the disease. These circumstances will modify the means employed, and will explain, in a certain degree, the different methods of treatment, proposed by different authors.

The principles to be observed in the treatment, should be in all cases, to relieve venous congestion, and to increase the arterial circulation, so as to moderate and change the discharge from the intestinal canal. These ends are to be obtained, in some cases, by reducing or rather diverting the mass of blood in the first stage, by increasing the sensibility of the nervous system by stimulants, and by equalising the circulation. By this means the powers of the system will be invigorated, and the secretions checked.

The symptoms of cholera varying so much in different individuals, stages, and epidemics, the internal remedies must be modified in each patient. When the disease is seen early, and the pulse is good, with sickness and

vomiting, repeated doses of the cold infusion of ginger (a) is to be given, until the water that is vomited is returned unchanged. This drink may be given in considerable quantities, as it evacuates the contents of the stomach, warms the body, and supplies the blood with serum; by which it restores the tone of the stomach, quenches thirst, and improves the appetite. Ten grains of calomel, with forty drops of laudanum in peppermint water are then administered, followed by one of the assafœtida pills, (b) broken down in mucilage, sago, or brandy and water. This is to be repeated, according to the urgency of the symptoms each quarter, half, or every hour, until the symptoms yield, and is to be left off by degrees in quarter doses. The pill may thus be repeated twice, thrice, or even five times if necessary. They were used at a very early period by the Hindoos with great success; and the prescription appears to have been translated from Sanscrit into the Arabic language. The sagacity of the late Sir Archibald Gallaway, detected it in an old Arabic MS. He found it of great use, and brought it into general notice in India, with immense advantage to suffering

(a) Take of horse raddish sliced, and mustard seed bruised, of each one ounce, to a pint of boiling water; infuse for two hours, and then add a sufficient quantity of salt: or take of bruised ginger 2½ ounces, infused in 2½ pints of boiling water for four hours—strain and add the salt.

(b) These are formed of equal weights of assafœtida (grs. iss to ii), and black pepper, with half the weight of opium. To be *kept* in a well closed phial.

humanity. He unfortunately left out the salt and ginger, in the original prescription; as I found them of much importance. (c.)

Five or ten grains of calomel should be given between every third or fourth dose of assafœtida pills, to promote the secretions, particularly the bile. When accompanied with restlesness, and cold perspirations, it should be combined with laudanum.

To allay the great irritation of the stomach when present, small doses of opium and camphor, and applying large sinapisms, made of good mustard powder and vinegar to the abdomen, will be of use, and may be repeated if necessary.

To assuage, in some degree, the great thirst, salted rice water, mixed with the above infusion of ginger; beef or chicken tea, rose water, tamarinds and water, honey and water, or a weak solution of nitric acid, may be varied and given in small quantities, and so repeated as not to interfere with the action of the medicines which the patient is taking. When ice can be procured it will be found most refreshing, allowing it to dissolve slowly in the mouth.

(c) See Commentary on Hindoo Medicine; particularly the receipt from Charaka. It is thus interesting to find a most useful remedy, employed with success in the cure of the fearful cholera, centuries before the Christian era. It was discovered and patronised by the Indian Government in a somewhat defective form: the omission was restored from the Sanscrit; and the receipt now forms, probably, the best internal remedy yet discovered for the cholera.

The treatment of the atonic form of cholera, which more frequently occurs in the young and old, and also in an early stage in particular epidemic visitations, and in the later stage of all forms of the disease, will require the system to be roused by the application of external irritants, and the administration of internal stimuli; such as ether, ammonia, the spirit of lavender, and camphor, or carbonate of ammonia pills: the selection being varied, and repeated according to circumstances.

Among the external applications, are bottles of hot water, bags of hot bran, sand, salt, or hot bricks, &c., which may be employed with benefit. In some cases I found great advantage from steeping a piece of flannel in hot water, wringing it out, sprinkling it with turpentine and applying it either to the pit of the stomach, or along the spine. A large plaster of good mustard powder and vinegar applied over the abdomen, will have a good effect in stopping the vomiting, and rousing the system. This application should be allowed to remain on until its full operation is produced; or a mixture of two parts of nitrous acid, and one of water, may be rubbed over the part to be irritated, until pain is felt. When this has been affected, the acid on the surface may be removed by being neutralized by a solution of tartar. It may then be removed, and a blister applied, when a more permanent irritation is required. A still greater degree of irritation may be produced by dipping a piece of flannel of the size of the part to be irritated, in boiling *water, and* applying it suddenly, and allowing it to remain

on the part a few moments. I remember the distress I felt when treated in India by the late able physicians Simon Nicholson and George Anglus, during a very severe attack of cholera, at being tormented with such applications. They roused for a time, but do little permanent good, from the weakness they produce; and although I mention them as the usual plan of treatment, they are not to be compared to the simple, and much more effectual *hemostatic* remedy.

The importance and novelty of this remedy requires a few words in explanation. During health the blood circulates through the body with a certain velocity, which is increased or diminished under different circumstances and diseases. It increases and diminishes the quantity of blood in parts, and the favourable action of many of our most powerful remedies is to counterbalance or remove such irregularities. But a more direct and certainly a more powerful means is by the hemostatic, or mechanical method of retarding the circulation in the extremities; by which more blood circulates over the head and trunk, removing morbid irregularities, and thus rendering the circulation more equable.

The great discovery of Harvey determined the principle, that we had, by means of the tourniquet, the complete command of the arterial circulation of a limb, and could, by means of a tight bandage, retard the return of a considerable quantity of blood from the extremities. Modern physiologists inform us that the quantity of blood in the whole body is about 28 lbs.; and that in ordinary health

there is about two pounds weight in each of the four extremities. These numbers will, perhaps, be allowed to be nearly correct, although the absolute quantity will vary in different individuals, and in different parts and conditions of the body. For instance, a person during active exercise will have the distribution of the blood all over the body considerably different from an individual in repose; and this difference will be still greater in disease. To ascertain the effect of this powerful remedy, I tried the following experiment in India upon a strong healthy young man.

When the temperature of the air was 80°, of the body 98, and the pulse at the wrist 80, I applied a clamp or horse-shoe tourniquet to compress the femoral artery, and the humeral of the opposite side of the body. In a few minutes the limbs became cold, numbed, but soft and flexible. The temperature of the hand, on the side to which the ligature was applied, fell to 93, and in the axilla, beyond the ligature, to 97. The other parts of the body felt much warmer, and perspiration covered the skin; the pulse was 80°, while the temperature in the axilla was 102°. Five minutes after the ligature had been applied to the limb, the heat of the surface, and the pulse in the rest of the body increased in velocity by twenty beats in a minute, so as to cause a flushing of the face, anxiety, and frequent respirations. In six minutes the obstruction of the circulation induced a tendency to faintness, as in a plethoric person. On the removal of *the obstruction* these symptoms disappeared, and the

pulse fell below its natural standard: and in an hour after, it beat lower than what it was previous to the application. Such local ligatures powerfully affect the system, as a pound or two pounds of blood make their way back to the heart, and increase the momentum and velocity of the circulation. The morbid distribution of the blood is thus arrested, internal congestions in organs are disturbed and eventually removed, by the increased quantity of blood which now circulates with greater velocity through the parts not affected by the compression, and a mild warmth is produced, followed by a retardation of the circulation after the ligature has been removed.

When the venous blood is arrested in a limb by the application of a field tourniquet, the arteries convey blood to the member, and more is retained in the limb than usual.

I may add a few remarks here on the general result of my experience. 1st. In numerous cases of ague in which I stopped the circulation in one or more limbs, previous to the accession of a paroxysm of ague; the cold stage was entirely prevented, and a slight attack of synocha followed. When applied at any time during a cold fit of ague, in two or three minutes after, the distressing pain was removed, and the feeling of cold was changed to that of warmth, which was rendered milder and shorter in its duration, and more easily influenced by medicine. Lieut. G—— was attacked with ague, and in the account now before me, he states—"I suffered for three

successive days from attacks of fever and ague. The fits commencing regularly at eleven o'clock A.M., on the two first days, the cold fit was slight; but fever, accompanied by severe pains in all my bones and joints, remained until evening. On the third day I experienced a severe attack of ague at the usual hour, and immediately sent to the native Doctor, to come over with the tourniquets, as recommended by you. He came in ten minutes, while I was shivering violently, and applied a tourniquet to the left thigh, and another round the right arm. They were kept on for several minutes. The shivering ceased immediately, and was succeeded by a mild fever, without any pain in the limbs, which accompanied all my former attacks. This occurred upwards of a month ago, and since then I have not had the slightest recurrence of the complaint, although for a long time previously I had been subject to constant attacks.'' He continued to reside in the same low damp house during a most unhealthy season without any return of fever.

In another case a middle aged Mussulman, residing in a low damp country house, surrounded by jungle and unhealthy tanks, was attacked with a quotidian fever, which increased in severity, and on the eleventh day, it was so severe as to endanger his life. The intermission was still marked. After administering an aperient and tonics; the next day, during the cold stage, a tourniquet was applied for ten minutes, when he complained of dizziness of the head, and it was removed. The cold stage was *quickly succeeded by* a gentle heat, which continued during

the day, and terminated in a gentle perspiration. He had no return of fever, and soon gained strength under the use of tonics and aperients.

These are favourable cases from being recent and not complicated with any organic disease, as an enlargement of the spleen, &c.; and one, or more, applications of the tourniquet are sufficient to cure the fever: it invariably cuts short the paroxysm. In all these examples a very slight modified form of fever followed, gradually reducing the enlargement of the spleen, particularly when recent, removing the pains in the bones and joints; and in no case was the application followed by any bad effects. Of 77 cases of intermittent and remittent fevers, 27 were cured by one application—of which 11 were uncertain; 26 by two or three applications (four uncertain); 19 by from four to six applications; and five by from seven to ten applications (one uncertain.)

A therapeutical agent of such power, and so easily managed, may also be employed with advantage in cases of convulsions, threatened apoplexy, hœmoptysis, tetanus, &c.; and will enable the practitioner to understand its importance in the cure of cholera.

2nd—*Convulsions.*—The hemostatic treatment may be employed in this class of disease with the happiest effects. Dr. Fouke of Cloyne, has kindly given me the following particulars of such a case. "A child six months old, without any premonitory symptoms, was seized with convulsions, for which cold was applied to the head, and I kept a steady

pressure upon the carotid arteries for fifteen minutes, when the child became conscious, and free from convulsions." This application relieves these dangerous symptoms; and affords time for other treatment. Along with such direct means tape ligatures may be applied, with care, to two or more of the extremities near their junction with the trunk, to prevent the return of the blood by the superficial veins, and thus diminish the quantity sent to the head. They may be slackened, and tightened, according to the symptoms.

3rd—*Apoplexy* is most liable to occur in old age, when blood is made slowly, and must be removed very sparingly to avoid a degree of weakness, which at that age is so difficult to remedy; and the hemostatic remedy may be used with great effect on the appearance of the premonitory symptoms of an attack of apoplexy. These are often well marked: such as vertigo, drowsiness, stupor, and various nervous affections of the external senses: such as transient deafness, or tenitus aurium, difficulty or incorrectness of speaking; unusual keenness, or loss of smell, formication, cramps and pains, with numbness, coldness, weakness, and a feeling of weight in the extremities. When the sight is affected, it becomes obscure, or is lost for a time; or flashes of light, or double vision distress the patient. The following may be instanced as an example of premonitory symptoms that would afford time for preventing an attack of apoplexy, as mentioned by the late Dr. Gregory. A gentleman was suddenly affected with double vision, *whilst out coursing*, and found fault with his game-keeper

for bringing four dogs out. The man protested he had only brought two; and the master being convinced, by the touch, that it was so, became aware that he was afflicted with serious cerebral symptoms, immediately went home, and shortly afterwards was struck with apoplexy, and died. The able Dr. Watson remarks that had there been an opportunity of bleeding this gentleman on the field, in all probability his life would have been saved. This can rarely be resorted to, under such circumstances; but pocket handkerchiefs tied tightly round the arms, near the shoulder would have the same effect; as it would prevent the return of the venous blood from the extremities. This accumulating in the members, retards the circulating volume, and the quantity sent to the head. Should this not be sufficient, it will give time until other means be employed.

4th—In those sudden and appalling cases of *uterine hemorrhage* the effect of the hemostatic treatment will in a great many cases arrest the fatal consequences; when the patient is left pallid, restless, and pulseless. Then the partially separated placenta may be removed, and cold and pressure may arrest the further loss of blood, and internal stimuli may produce a return of animation, without which the patient sinks into a state of collapse, and dies exhausted. The simple means of preventing such a result is by stopping the circulating fluid proceeding to one or more of the extremities; by which a considerable amount of blood is directed internally. The person soon rallies, and the absorbents rapidly take up the liquids in the

stomach, and the patient is saved. Dr. Wardrop informs us that the late Mr. Hyslop having bled a lady to syncope, became alarmed at its long continuation; but on accidentally raising her from the horizontal position by grasping her arms, and thus supporting the weight of her body, she rapidly recovered; surprised at this, Mr. Hyslop was led to reflect what could be the cause of so sudden a restoration of the heart's action, and he became convinced, that whilst elevating the body, and allowing its weight to be supported by that part of the arms along which the brachial arteries pass, he must have compressed these vessels. The effect of this compression was an impediment to the flow of blood through these arteries, and consequently an accumulation of blood in the heart, from which he concluded that the rapid recovery of this patient from syncope was analogous to the artificial process of transfusion; and he proposed to adopt it in cases of syncope, and apparent drowning, in order to revive the heat.*

This rousing of the system will be more effectually accomplished by raising the limbs, pressing the venous blood onwards, and applying a clamp tourniquet to the humeral and femoral arteries, by which, under ordinary circumstances, upwards of a pound of blood, sent to each limb, is stopped, and finds its way back to the heart. This diminished circle and increased volume of blood stimulates the heart's action, and has a powerful influence in strengthening the exhausted system.

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* *On* diseases of the heart, part 1, page 18, London, 1839.

5th. In certain cases of great debility, or exhaustion; I found this remedy of much use, and sometimes applied the tourniquets to the four extremities so as to direct the blood to the internal parts of the body, and thus afford the only means to produce re-action, and give time to exhibit nourishing food to revive the system. (g.)

6th. It will be now understood the great advantage of the hemostatic treatment in the collapsed stage of cholera. In many cases, when the physician first sees his patient, the system is so much prostrated that the most powerful medicines have no effect, and the application of the tourniquet affords the only chance of cure. This most powerful remedy immediately removes the painful cramps. During the late epidemic of cholera in Edinburgh, Dr. Warbuton Begbie, the distinguished Physician of the Cholera Hospital, states that he found no means "so successful in controlling the violence of the cramps as the application of the ordinary tourniquets, as recommended by Dr. Wise. The relief I have seen afforded from this simple means has been very great—I can scarcely say too much in favour of this expedient; in several cases where the violence of the cramps in the limbs was so great as to threaten life, I have regarded the employment of the tourniquets as eminently conducive to the recovery of the patients." (7) I regret this able observer had not tried

(g.) See M'Cleland's Journal, No. 28, particularly page 504. Calcutta.

(7) Short account of cases treated in the Cholera Hospital; read at the Medical Society, Edinburgh, Jan. 3rd, 1855.

the tourniquets for arresting the circulation, particularly in the collapsed stage of cholera, as I am satisfied he would have found it as successful in promoting reaction; by producing the same equalizing effect as blood-letting, without the debility caused by this evacuation. It likewise increases the volume of internal circulating blood, which stimulates the heart to increased action, removes morbid congestions, changing the morbid distribution of blood from the secreting surface of the alimentary canal, and sets up a new and salutary action in their place. It thus affords the most ready and most powerful means of rousing the system. By this means the purging and vomiting are stopped, the pulse becomes stronger, the heat and strength of the system are restored, and time is allowed for medicines to act.

The tourniquet may be applied to two, or to the four extremities, according to the effect intended to be produced. When the individual is weak, and the state of collapse great, more care is required in emptying, by friction, the blood in the veins of the extremity to be bandaged; and the effect will be more marked if the tourniquet be applied to four extremities. It may be kept on for hours, or even for a day or two. In one case I kept the tourniquets applied for three days with the best effects—as the exhaustion was very great, only relaxing one or more, as it appeared necessary. When reaction had taken place, by slackening cautiously one of the tourniquets, so as to allow the blood to flow to the extremities, it afforded a ready *means of* relief.

In a pretty extensive experience I have not seen any bad consequences produced by the application of tourniquets. The effect, however, varies according to the stage and severity of the disease. It requires to be employed when the blood is circulating in the members, and before the patient is completely exhausted. When the patient is stronger, or when reaction has taken place, the pressure of the tourniquets may be complained of—and much care is required to prevent the patient loosening them. If it be done too abruptly the blood spreads over the extremities, and the patient rapidly sinks, as occurred in the following cases:—

Case I.—A young lady who had recently joined her parents in India; on a damp evening, walked along the bank of the river, which had been covered with water during the rains. She wore a light dress, and thin shoes, which she did not change at dinner, and went early to bed. During the night symptoms of cholera appeared, and I was sent for. The frequent and peculiar discharges, the state of the pulse, and the cramps, proved the severity of the attack. I immediately acted in the usual energetic manner, without much effect; and in the morning I requested the assistance of an old and able physician. On learning the history, and the result of the treatment that had been employed; and as she appeared to be sinking, he considered there was no hope of saving the life of the patient. I proposed the application of tourniquets, which he warmly recommended. They were applied to an arm and a thigh; and the result was soon most

marked, and gratifying. The cramps ceased, the cold and clammy skin became warm, the pulse resumed its action, and the pale sunken face became animated with a flush. I then slowly relaxed one of the tourniquets; and, having other urgent calls, I left the patient under the charge of my medical friend, with strict injunctions not to touch the tourniquets until my return; and pointed out the danger of such a proceeding. He understood, and carefully observed my instructions; but, as the young lady dozed, he left the room, and did not return for some time, when he found all the unfavourable symptoms had returned; and then learned the young lady herself had persuaded her sister to unscrew the tourniquets; the blood that was animating the body flowed again to the extremities—the heart, weakened by the loss, ceased to act with the same energy—and all the fatal symptoms returned, and she died that night.

In severe cases, the tourniquets should be kept on until reaction begins, when that on one extremity is to be set free at a time, and again, if necessary, *tightened*, to prevent the relapse—which is always most dangerous, as witnessed in the following case:—

Case II.—Gunga Sing was brought, at noon, to the hospital, in the collapsed stage of cholera. There was great anxiety, no pulse at the wrist, and great thirst, with vomiting and purging. The tourniquets were applied; and the body soon became warm. They were continued all day and night, at times loosened; and were removed for some hours the following morning. The body

was much warmer; but the eyes continued sunk, and turned upwards, inanimate, and filled with mucus; he was very anxious and restless, and the pulse continued small and weak. The temperature of the body 100. He complained of the tourniquets; and at last removed them for a time. 25th. Still anxious and restless, with 24 respirations in a minute. In other respects better. The appearance much improved; eyes more animated and clearer; and he ate some arrow-root with appetite. To-day he would not allow the tourniquets to be applied; they seemed to irritate him. The circulation being then left free, the warmth of the body diminished, the pulse became imperceptible, and collapse and death followed. The usual remedies had no perceptible effect on this patient.

These cases illustrate the danger of leaving off the tourniquets, or slackening them too soon. It requires much care and attention to do this properly. The rule being to relieve any symptoms of congestion by relaxing the ligature for a time, according to the state of the patient.

The following are cases in which tourniquets were used, and in which medicines, in all probability, would have been given in vain :—

Case III.—Shakh Hoosen admitted into hospital, under the care of Dr. Eastall, with the usual symptoms of cholera. The pulse was imperceptible at the wrist—body covered with cold perspiration—no secretion of urine—and the evacuations from the bowels were passed involuntarily. Four grains of calomel, and four of quinine, with a grain of opium, were given, and washed down with

brandy and spiced warm water. As the unfavourable symptoms continued, and as I had recommended the tourniquets in such cases, four were applied to the four arterial trunks of the extremities, and at the same time a draught of the *drogue amere*, laudanum, and peppermint water, was administered. In the evening he was found without pain, the action of the heart stronger, and the body warmer. He complained of the tourniquets, and loosened them himself during the night. In the morning they were again tightened. All the bad symptoms had disappeared, he was warm, his voice was stronger, and he felt better. The improvement continued during the day, and two of the tourniquets were removed at night. He continued to gain strength, and he soon left the hospital quite well.

The following cases were reported by one of my intelligent assistants :—

Case IV.—Hurrooman, aged 25, was brought to the city hospital, in consequence of several liquid evacuations, which had reduced him very much. He had no pulse at the wrist, and complained of severe cramps in the muscles of the legs. A cholera pill, composed of black pepper, assafœtida, and opium, was given, suspended in mucilage, with salt ; and an infusion of ginger for drink ; with hot bricks to his feet, and turpentine and oil rubbed over his body. The application of the tourniquets immediately stopped the cramps, and soon improved the pulse. He continued restless, with occasional severe pain in the *abdomen*, which went off. The heat of the body was

improved, the cramps did not return, and he left the hospital quite well, three days after admission.

Case V.—Noor Mahammud was brought to the hospital labouring under a severe attack of cholera. He had incessant purging and vomiting, with no pulse at the wrist, and the skin cold. The tourniquets were immediately applied to a leg and an arm, a sinapism to the abdomen, and cholera medicines administered. The purging and vomiting ceased, the heat of the body improved, and he slept comfortably. Next day he felt well, and continued to get stronger: on the fourth day he was discharged cured.

Case VI.—Ducas Sing, aged 30, was admitted, yesterday afternoon, into the city hospital, in the collapsed stage of cholera. He had vomited, and his evacuations were liquid; his body was cold; pulse small, weak, and rapid—probably from the exertion of being brought to the hospital—for it soon became imperceptible, and his eyes were sunken and lifeless. Narcotics, and the usual stimulants were employed without effect, and he continued to complain of thirst. Two tourniquets were applied—one to an arm, and the other to the opposite leg—which had soon the effect of improving the pulse, and the warmth of the body. He loosened the tourniquets several times, as they felt uneasy; and he fancying his uneasiness might proceed from the tight bandage, removed them altogether during the night. In the morning he felt quite cold, eyes sunken, and pulse imperceptible at the wrist. The temperature of the air was then 86°, and that of the

axilla 96°. The tourniquets were again applied; and in a short time the pulse became full, soft, and 112 in a minute, and the temperature of the surface somewhat increased—being in the axilla 97°. He felt better, and was inclined to eat.

30th.—After he had taken a pill containing 10 grains of calomel and one of opium, he had three pale motions; and the secretion of urine was free, and of a good colour. Slept well, pulse full, skin still cold. Next day, in consequence of a congestion of blood in the head, three leeches were applied to the temples with advantage, after which the patient felt well, and wished to go home, but was induced to remain two days longer in hospital.

Case VII.—Sadee Mistorie, aged 30, was admitted into the hospital on the 23rd of October, in the collapsed stage of cholera. He passed rice-water stools, and had frequent vomiting; with imperceptible pulse. Tourniquets were applied to the two arms and legs, and only loosened occasionally, as required. The pulse soon improved, and next day was 84, small and weak; trunk warm, and temperature 98°.

25th. Body cool; pulse still small, weak, and 88°; still purged. The tourniquets had been removed for two hours before I visited the hospital. On their being again applied, the pulse soon became more full and regular, and the warmth of the body increased to 99°. The usual cholera medicines were administered.

26th. Improved in every respect. The tourniquets were *continued.* *27th.* Nearly well; slept comfortably; and

the temperature of the body and secretion of urine natural. The dejections were of a good colour.

30th. The tourniquets were left off by degrees, and he was discharged the hospital quite well, on the 3rd of November.

CASE VIII.—A Gentleman of the civil service, who had been many years in India, had latterly become indolent, had left off early rising, and had got stout. He had been "out of sorts" for a week, but not sufficiently so to require assistance. On Sunday he partook of some ham, and ate two hard-boiled eggs. He felt the food had not agreed with him; but went to church in the evening; and at night slept under a punkah, with the bed-room window open: an unusual occurrence. Unfortunately there was a strong, cold easterly wind blowing over the garden, which had been raised from the river, but was not entirely filled up; and, as the water of the river retired, it left this garden a marsh, covered with rank vegetation—a very hot-bed of malaria; particularly when the cold, damp, easterly wind passed over it, and upon a person asleep. At 3 a.m. he awoke, and had a large rice-water stool, from which he felt faint. He had several more, in the course of the morning and forenoon, of the same nature, without any bile or feculent smell. He became sick, and the cramps were frequent and very severe in both legs during the day. Frictions of hot turpentine and oil had little effect, but the cramps were immediately removed by the application of the tourniquets. They were slackened; and when the

spasms returned a turn or two of the screw removed them. "A little more," he said, "that will do; the cramps are gone." This was not once, but frequently said; for it was repeated as often as required, and always removed the painful cramps, the most distressing symptom of this most painful disease. In this patient the pulse weak, but still sensible at the wrist; and I did not require to stop the circulation so much to produce reaction as to stop the painful cramps. Repeated large mustard poultices were applied to the abdomen, and scruple doses of calomel and large doses of laudanum, produced little or no effect. The weakness increased towards evening, when the ends of the fingers became cold and blue. A quart of salt water, with a drachm and a half of laudanum, was thrown up the rectum, and appeared to be of use. Half an hour afterwards it was returned little changed. He now felt more comfortable; had snatches of sleep towards morning. As his bowels had not been affected for 16 hours, 10 grains of the extract of colocynth and five of calomel, were given, and brought away a liquid bilious stool; the secretion of urine followed. On the 14th of July, he complained of pain in his head, which was removed by the application of a few leeches. He continued from this time to improve, though slowly; in consequence of a weakened constitution, and the unhealthiness of the season.

The following conclusions may be deduced as to the use of the tourniquets in the collapsed stage of cholera:—

1st. By their pressing upon the nerves, it stops the

distressing cramps of the extremities.

2nd. By increasing the quantity of the circulating fluid in the trunk, and thereby stimulating the heart's action, it removes morbid congestions, stops the secretions from the bowels, increases the animal heat, and powerfully tends to restore health.

3rd. By increasing the vigour of the constitution, medicines act more powerfully, and in a more salutary manner, by removing morbid actions.

4th. When the reaction has taken place, by loosening the tourniquets with care, the congestion of blood in the internal parts is diminished by its diffusion over the extremities, upon which the tourniquet had been placed. The ligatures are immediately to be retightened, when there is any coldness or weakness experienced, or any tendency to relapse. This must be most carefully watched for, and prevented.

Along with the tourniquets, frictions of the unbandaged limbs, and other parts of the body are to be used, with a mixture of the spirit of turpentine, and camphorated mustard oil, to assist in rousing the patient from the cold, or collapsed state in which he is in. After this the limbs are to be covered with clothes wrung out of hot water, sprinkled with turpentine, and then the patient is to be covered with blankets. This has a powerful influence in producing reaction, and a warm perspiration over the skin, to the great relief of the patient.

The next object is to promote the biliary secretion, by administering a dose of calomel, and laudanum,

followed next morning by a dose of castor-oil. For drink, ginger infusion, flavoured with salt may be continued ; and the strength supported by thick sago, arrow-root, flavoured with wine or brandy, according to the peculiarity of the case.

In severe cases of cholera I have used salt and warm water, with a drachm and a half of laudanum as an injection, with very good effect.

When the symptoms have yielded to the remedies, they must be slowly discontinued, and the reaction carefully watched. In the European this is often better defined than in the Asiatic; the eyes become suffused and sensible to light, headache distresses him, and pain in the ears is complained of. The urine is passed with pain, and is high coloured. These with other symptoms of continued fever require to be treated carefully, by which relapses will be prevented, and the organs restored to their healthy condition. This is generally accomplished by the application of a few leeches to the temple, or behind the ear ; by which the blood is removed more directly from the head. Should the fever continue, a blister to the nape of the neck may be found necessary with pediluvia, mustard poultices to the calves of the legs, and vinegar and water, or goulard lotion to the head. Here too the application of a bandage to retard the blood in one or two members, will be of great advantage; and will prevent the necessity of removing blood from the body.

Seven or eight hours after the cholera has been removed, calomel and opium, with a dose of castor oil and laud-

anum in the morning, should be given, to remove any vitiated secretions, that may remain in the intestines. When the oil is not retained, a drachm of the compound jalap powder may be given, in two ounces of peppermint water. Pills composed of the compound extract of colocynth, blue pill, and a small proportion of ipecacuanha will be found useful in such cases.

In children the symptoms of cholera are not so well marked as in the adult. Purging is usually present of a pale coloured fluid, with less frequent vomiting, than in the more aged. Cramps seldom occur; and the little patient rapidly sinks. The same plan of treatment is to be followed, as in the adult, varying the dose, and kind of medicine, by the age and peculiarity of the symptoms. A half, or quarter of the assafœtida pill, with calomel and chalk, may be alternated with the compound chalk mixture, and small doses of Dover's powder. In many of these cases there is no time for the administration of medicine, so rapidly does the disease run its fatal course, and compression with a bandage over the artery is to be immediately used. In some fatal cases the child lives for days, during which it has one or two large pale liquid evacuations. Warmth, sinapisms, judicious frictions with oil and bandaging the limbs, must be employed as affording the only chance of recovery.

Considerable excitement sometimes follows the decline of the disease of children, indicated generally by a dry and hot skin, accelerated and weak pulse, dry and parched tongue, spasmodic action of different sets of muscles,

and the pupils of the eyes are turned upwards, with a great degree of depression. In some cases the child from a state of stupor suddenly cries out, and again falls into a quiet sleep. Such symptoms indicate a congestive state of the brain, which is to be treated by cold applications to the head, a leech may be necessary, and aperients with the hot foot-baths, and sinapisms to the extremities.

CHAPTER VI.

APPENDIX.

CHARACTERISTIC SYMPTOMS OF CHOLERA, WHICH MAY BE RECOGNISED BY A NON-PROFESSIONAL ATTENDANT, WITH GENERAL DIRECTIONS FOR THE TREATMENT OF CHOLERA, PREVIOUS TO THE ARRIVAL OF THE PHYSICIAN.

The distant situation of the patient, at the time of an attack of cholera, the hurry and confusion attending the sudden emergency, and the importance of following a prompt and judicious treatment has induced me to add, in this chapter, a list of the most prominent symptoms, and summary of the treatment to be adopted before the arrival of the physician, as an useful appendix to this treatise. How many patients have lost their lives from not having been treated at an early stage of the disease, and others from remaining exposed to the exciting causes!

When an outbreak of cholera is anticipated, there is always an important period of warning when the depths of poverty and distress should be searched out, and relieved, when the wretched should be comforted by soothing encouraging language; and when the dissipated,

and the thoughtless should be warned. Then those residing in filthy dark, ill-ventilated abodes, should if possible be removed to higher and purer air, and afforded those comforts they stand in need of; such as firing, warm clothing, and nourishing food according to the season and climate.

The best preventatives, therefore, against an attack of cholera, during the prevalence of an epidemic are moderation in diet, avoiding raw vegetables, and whatever is found to disagree with the stomach, and fermented and spirituous liquors in excess, are peculiarly injurious. Flannel is to be worn next the skin, with a broad belt round the stomach, the feet should be kept dry and warm, and the bowels regular with a simple aperient pill if necessary. When much exposed to the weather a grain of quinine should be taken twice a day, on an empty stomach; exposure to cold damp weather, particularly the early morning and night air should be avoided, especially before eating; and the sleeping room should be elevated, warm, and well aired.

During epidemics the cholera sometimes appears in the cleanliest houses; attacking the strong and vigorous who are exposed to the predisposing and exciting causes; and by removing these, and by using proper precautionary means the fatality of cholera may be averted: the extent of its ravages being only formidable from neglect; and the fatal list is greatly diminished by proper sanitary arrangements. This is done by pointing out to the ignorant *the danger of* continuing their vicious habits, and among

the poor, the importance of diminishing the severity of the premonitory symptoms, and avoiding the predisposing, and the exciting causes which surround them.

It is possible cholera may be conveyed from one person to another by the breath, or dejections of the sick. Such cases I have never seen; and I am certain that among the class upon whom the duty of attending to the sick cholera patients must devolve, when the health is good, and the mind firm there is no danger from contagion. I have breathed the atmosphere of patients in the worst form of cholera in confined apartments for many hours, at all times, and seasons—yet the physician, the nurses, and attendants, escaped the disease.

The symptoms of cholera will thus vary in different seasons and epidemics; and from the rapidity of its course it is of great importance to judge of these varieties of symptoms; and how to act in the commencement of the disease, till the arrival of the physician.

The attack of cholera is sometimes sudden, when the person appears in good health; commencing with sickness, vomiting, and purging of a liquid, light coloured, turbid fluid, like whey or rice water. In other cases the attack is preceded with a looseness of the bowels; to the extent of three or four evacuations daily, with griping pains. These motions are at first thin but natural, like those of common diarrhœa; but as the disease advances they assume the characteristic appearance of the cholera evacuations—namely a pale watery matter, like thin gruel. In either case the individual feels sick

denly weakened, the countenance contracted, anxious, and cadaverous, the eyes sunk, with a cold moist skin, and feeble pulse. Painful cramps of the extremities and abdomen follow; and the vomiting and purging become more violent, with a severe burning heat in the pit of the stomach, and urgent thirst. There is great coldness of the body, restlessness, and distress, while the mind remains unimpaired, with great languor, lassitude, and prostration of strength. The surface of the body is shrivelled, the sunken eyes have a livid circle round the eyelids, and a leaden or bluish appearance of the countenance, especially of the lips and nails; the pulse is very weak, and the voice is changed to a whisper. There is likewise a suppression of urine, saliva, and bile.

When the pulse increases in strength the skin becomes warmer, the vomiting, and purging, together with the cramps, and insatiable thirst have abated, the stage of reaction has commenced, and great caution is necessary for many days, that he fall not again back into a state of extreme danger. In fatal cases these symptoms are calmed on the approach of death, which follows from eight, or from twelve to thirty six hours of the attack.

No time should be lost in sending for medical aid, as no two cases are exactly the same, and each must be treated by the judicious practitioner according to the severity of the symptoms present; but, such is the sudden and dangerous form of the disease, it is most desirable *not to lose the* time that must pass before such assistance

can be procured, and the cholera patient must be treated according to the judgment and intelligence of the attendants.

The first object before the arrival of the physician is to employ domestic remedies to quiet the vomiting, and purging, to rally the animal powers, and to restore the bile, and other secretions. The patient is to be placed in bed between warm blankets, and surrounded with bottles, or bladders filled with hot water, and bags of hot sand or salt should be applied along the spine, and to the calves of the legs; and he should have immediately administered to him a dessert spoonful of mustard powder in a tumbler of warm water, with continued friction of different parts of the body with coarse hot cloths, and turpentine and oil. These means should be continued during the course of the treatment, diminishing or increasing them according to the state of the circulation and heat of the skin. The characteristic symptoms must be watched, and should a relapse take place the same means are to be repeated. Five grains of calomel, and a table spoonful of a mixture composed of a tea spoonful of laudanum, added to six tablespoonsful of brandy may be repeated every quarter, or half hour, in a wine glassful of hot water.

For drink a cold infusion of ginger, and culinary salt; and ice may be allowed to melt in the mouth. This should be followed by an assafœtida pill, broken down,* and given in sago, or brandy and water, and repeated

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* See receipt, page 30.

every quarter, or half hour according to the urgency of the symptoms. An injection of three or four pints of warm water, or thin arrowroot will be useful, in which a teaspoonful of laudanum has been added. This may be repeated if the symptoms are severe. The animal powers are to be rallied, and the painful cramps removed by the application of a bandage to stop the blood proceeding to one or more extremities, by means of a garter, in which is inserted a pad of cotton of an oblong figure. This is placed over the bloodvessels to retard the blood in the humoral and femoral arteries, as they pass out of the trunk. Before this bandage is applied the limb is to be rubbed upwards to remove the blood, and the ligature is to be so tied as to stop the circulation in the arteries. I generally applied the pressure to the femoral and humoral vessels of the opposite sides. These bandages are kept on for an hour or two, or until the dangerous symptoms have disappeared, and reaction has taken place; when first one is to be slackened and slowly removed, followed by the other ligatures.*

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* See page 50, et sequ.